**769-300** (ITW 13199)

# METHOD AND APPARATUS FOR FORMING DOUBLE ZIPPER BAGS

## BACKGROUND OF THE INVENTION

The present invention relates to the manufacture and filling of zipper packages on horizontal form fill and seal (HFFS) machines and, in particular to a method for forming such packages two-at-a- time so as to improve production rates and reduce production costs.

It has heretofore been proposed to form and fill packages on HFFS equipment. Such equipment is particularly well suited for the packaging of solid objects such as block or sliced cheese, cold cuts and the like. It has further been proposed to package such items in zippered packaging so as to facilitate the storage and containment of any unused portions of the package after the package is initially opened. Such a method and apparatus is depicted, for example, in USP 6,185,907. While such packaging has many apparent benefits a disadvantage is the associated cost which is at least partially due to the production rates and capital expense required to set up the production lines. The problems become complicated where, in addition to a zipper the package is to include a slider to facilitate opening and closing the zipper.

## SUMMARY OF THE INVENTION

The present invention is a method and apparatus for continuously forming and filling reclosable plastic bags, which include sliders, two at a time. In accordance with the disclosed method a base film of plastic bag making material is horizontally advanced in a longitudinal direction of the film web. The product to be packaged is transversely

loaded onto the base film in first and second longitudinally extending lines with the products of the first line aligned with those of the second line. First and second continuous zippers are then applied onto the base film between the lines of product, each of the zippers comprising first and second profiles having mating interlocking portions. Sliders are provided on the zippers between zipper stops formed at bag width intervals. A cover film of plastic bag making material is placed over the base film covering the lines of product and the zippers. The cover film is joined to the base film along longitudinally extending lines disposed on sides of the product opposite to the two zippers. In this connection the cover film may be a separate web in which case the edges of the base film and cover film would be sealed together or the base film and cover film may be formed of a common web with the portions defining the cover folded over the portions defining the base. The first profile of each of the first and second zippers is attached to the base film, the second profile of each of said first and second zippers is attached to the cover film and the base film is attached to the cover film between the first and second zippers. The base film is then sealed to the cover film along transverse seal sections on opposite sides of each row of product running through the zipper stops. The thus formed and filled packages are separated by longitudinally cutting through the base film between the zippers and cutting through the transverse seal sections.

## BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

Fig. 1 is a simplified perspective view of a HFFS machine in accordance with the present invention;

Fig. 2 is sectional view taken along reference lines 2-2 of Fig. 1 in the direction indicated by the arrows;

Fig. 3 is a fragmented top plan view of the bag forming section of the HFFS equipment of Fig. 1;

Fig 4 is a schematic representation of a spot seal formation and slider attachment mechanism that may be used in accordance with the present invention;

Figs. 5A - 5F schematically depict the steps of forming reclosable packaging in accordance with the present invention from base and cover films supplied from separate rolls;

Figs. 6A – 6F schematically depict the steps of forming reclosable packaging in accordance with the present invention from base and cover films supplied from a common roll;

Fig. 7 is a fragmentary perspective view of an alternative construction for the sealing station utilized in the present invention, for simplicity only half of the section being depicted;

Figs. 8A and 8B schematically depict the sealing arrangements, for simplicity only half of the section being depicted; and

Figs. 9 and 10 schematically depict alternative zipper arrangements that may be used practicing the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Reference is now made to the drawings and to Fig. 1 in particular wherein a HFFS apparatus 10 in accordance with the present invention is depicted. A base film 12 is fed under roller 14 to move horizontally in the longitudinal direction of the base film web under the action of drive rollers (not shown). At a filling location, product 16 is placed on the moving base film in two parallel lines (whose center lines are designated 18 and 20) extending in the longitudinal direction with the products in the two lines being transversely aligned with each other.

A first continuous zipper 22 and a second continuous zipper 24 are fed via and between guide rollers 26 and 28 onto the base film between product lines 18 and 20. Each of the zippers includes a pair of profiles including complementary interlocking portions that are mated with one another in the customary fashion. The zippers are oriented on the base film with one of the profiles overlying the other profile. Each of the profiles further includes a flange and the flanges 31a and 31b and 33a and 33b of zippers 22 and 24, respectively are separated by separator guides 30a and 30b, respectively, as the base film and zippers move toward a sealing station 32 as shown in Fig. 2. The separator guides serve to align the zippers with the sealing heads and prevent the flanges from sealing together, thereby avoiding the necessity for closely controlled temperatures. At the entrance to the sealing station 32 a cover film 34 is fed over the base film covering the lines of product 18, 20 as well as the zippers 22, 24. Alternatively the zippers could be placed on the outsides of the product lines rather than between the product lines.

At the sealing station 32 several things happen. The longitudinal edges 36, 38 of the cover film 34 are sealed to the longitudinal edges 40, 42 of the base film by heated sealing rollers 44, 46. The flanges 31a, 33a of the lower profiles of zippers 22, 24 are sealed to the base film 12 with heated rollers 50, 52 while the flanges 31b, 33b of the upper profiles of zippers 22, 24 are sealed to the cover film with heated rollers 54, 56. Finally, at a location between zippers 22 and 24 a joined section 58 is formed by sealing cover film 34 to base film 12.

An alternative sealing station 132 is depicted in Fig. 7 and 8B. In accordance with this embodiment, a hard seal between the zippers is formed by sealing rollers 156 to join the cover film and the base film. The zipper flanges 131a and 131b are respectively sealed to the cover film 134 and base film 112 by rollers 154 acting from opposite sides against separator guide 130. The cover film 134 and base film 112 are sealed to one another with a peel seal 160 by sealing rollers 162 below the flanges so that the envelope for product 116 may be hermetically sealed. To facilitate opening the finished package, a pair of perforation rollers 164 perforate the cover film 134 and base film 112 by operating against guides 168a and 168b between the flange/film seals formed by sealing rollers 154 and the film/film seal 158 formed by rollers 156. In a slight modification shown in Fig. 8A, the perforation rollers may be moved outboard of the zipper 124 to avoid the need for guides 168a and 168b. The perforation lines allow for the creation of a tamper evident header above the zipper of the finished bag which must be removed by the consumer before the opening of the finished package. Other combinations of peel seals and lines of weakened resistance can be provided by varying the location of the hard seals, peel seals and lines of weakened resistance.

Downstream of the sealing station 32 the joined section 58 is longitudinally cut by cutter blade 60 and the individual packages are formed by cross seal/cutting bar 62 forming transverse seals across the base and cover films which are joined to each other above the zippers by the remnants 58a and 58b of joined section 58. The transverse seals are formed on both sides of the product to encase the product and separate each package from the remainder of the packages being formed.

The zippers 22, 24 are provided with sliders 64 each slider being mounted on the zipper between slider stops 66. The slider stops prevent the slider from running off the zipper at the full open and full closed position. To this end, each adjacent pair of slider stops is spaced apart by a distance equal to the width of a bag to be formed and the HFFS machine is programmed so that the cross seal/cutting bar 62 cuts through the formed end stop thereby leaving a portion of each end stop in the lagging side of the bag being formed and a portion in the leading side of the next bag to be formed. As shown in Fig. 4, the end stops 66 for each zipper 22, 24 are formed by a traveling spot sealer 68, such as an ultra-sonic sealer, that spot fuses the two interlocking portions and surrounding material of the zipper profiles together while traveling with the zipper so as not to interrupt the line. The fused portions define the end-stops 66 by interrupting the zipper track to prevent further movement of the slider. After the spaced spot seals are formed a slider is attached to the zipper 22, 24 by attaching mechanism 70. Alternatively, the spot seals and sliders could be intermittently formed and attached in which case a dancer roller arrangement would be used to convert the intermittent movement of the zipper to the continuous movement through the HFFS machine.

Referring to Figs. 5A - 5F, it can be seen that as the base film 12 advances product 16 is deposited onto the base film. Two lines of zipper, 22, 24 with attached sliders are then deposited on the base film between the product and the base film with product is then covered by cover film 32. The zippers are sealed to and between the base and cover films. The edges of the base and cover film are sealed together as is a section 58 between the zippers. The transverse seals are then formed to produce two head-to-head packages as shown in Fig. 5E and the individual filled packages 72 are then separated from one another.

Reference is now made to Figs. 6A – 6F, wherein a modification of the method described above and depicted in Figs. 5A - 5F is shown. In accordance with the modification, a combined film 74 is longitudinally advanced. The film 74 is "combined" in that it is sufficiently wide to include a center section 76 and side portions 78 on opposite sides of the center section. The product 16 and zippers 22, 24 are loaded onto the center section where-after the side portions 78 are folded over the center section each side portion encasing its associated line of products and zipper. It will be appreciated that the center section 76 now serves as the base film and the side portions 78 serve as the cover film of the previous embodiment. The marginal edge sections 80 of the side portions 78 are then sealed to the center section as the flanges of the profiles of the zippers 22,24 are sealed to the side portions and center section as shown in Fig. 6F. This may be by a conventional "hard" seal or with a peel seal line 81. During the sealing process the free edges of the marginal edge sections 80 are kept apart by separator 82. The center section is then longitudinally cut between the seals 81 and the transverse seals and cuts are formed as before to produce the desired separated packages 86.

As shown in Figs 9 and 10, to facilitate feeding and attaching the zippers 22 and 24 the bottom flanges 31a and 33a may be joined to a common web 88 which, in turn is attached to the base film 12, as shown in Fig. 9. In Fig. 10 the flanges 31a and 31b are formed somewhat longer, bent 180° and then joined to one another to form a common web which is then attached to the base film.